

CORD MEMBER SAFETY CONNECTOR FOR WINDOW BLIND

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates generally to a window blind and, more specifically, to a cord member safety connector used in a window blind, which will be self-unconnected from the window blind when the cord member receives an exceeding load.

2. Description of the Related Art

10 A variety of window coverings including Venetian blinds, roller blinds, etc. are known. These window coverings commonly comprise a headrail, a bottom rail, a blind body coupled between the headrail and the bottom rail, a lifting mechanism controlled to lift the bottom rail to the desired elevation to further change the shading status of the window covering. The lifting mechanism comprises a plurality of pull
15 cords for operation by the user to adjust the elevation or shading status of the window covering.

 In the aforesaid window coverings, the pull cords are exposed to the outside and accessible to children. An accident may happen when a child playing with the cord members for fun. FIG. 1 shows a conventional roller blind, which comprises a headrail
20 1, a bottom rail 2, a blind body 3 coupled between the headrail 1 and the bottom rail 2, and a lifting mechanism 4 adapted to control the lifting and positioning of the bottom rail 2 to change the shading status of the blind body 3. The lifting mechanism 4 comprises two lift cord sets 5, two lift cord brackets 6 at the back side of the headrail 2, and a lift lock 7. The lift cord sets 5 each have a respective rear cord section 5a
25 respectively fastened to the lift cord brackets 6 and then extended downwards over the

bottom side of the bottom rail 2, a respective front section 5b extended upwards to the inside of the headrail 1 and then inserted through the lift lock 7, and a respective operation section 5c extended out of the headrail 1 for operation by the user. The rear section 5a and front section 5b of each cord member of the lift cord set 5 form an enclosed loop 5d. This enclosed loop 5d may be tangled and hung on the retaining portion of the child who plays with the lift cord sets 5 for fun.

Therefore, it is desirable to provide a cord member safety connector that eliminates the aforesaid problem.

10 SUMMARY OF THE INVENTION

It is the main object of the present invention to provide a cord member safety connector, which automatically disconnects the cord member from the window blind when the cord member received a stretching force surpassed a predetermined level.

To achieve this object of the present invention, the connector for connecting a cord member of a window blind includes a supporting member and a coupling member detachably coupled to the supporting member. The supporting member has a receiving space and an escape opening that is communicated with the receiving space and has a diameter smaller than that of the receiving space. The coupling member has a retaining portion received in the receiving space and stopped above the escape opening, and a cord member tie portion for connection of the cord member. When the cord member is pulled by an external force over a predetermined level, the retaining portion is allowed to pass through the escape opening such that the coupling member is detached from the supporting member.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a window blind according to the prior art.

FIG. 2 is an exploded view of a cord member safety connector according to a
5 first preferred embodiment of the present invention.

FIG. 3 is a schematic sectional view of the cord member safety connector according to the first preferred embodiment of the present invention.

FIG. 4 is a perspective view showing the cord member safety connector of the first preferred embodiment of the present invention installed in a headrail of a
10 window blind.

FIG. 5 is an exploded view of a cord member safety connector according to a second preferred embodiment of the present invention.

FIG. 6 is a perspective assembly view of the cord member safety connector according to the second preferred embodiment of the present invention.

15 FIG. 7 is an exploded view of a cord member safety connector according to a third preferred embodiment of the present invention.

FIG. 8 is a sectional assembly view of the cord member safety connector according to the third preferred embodiment of the present invention.

FIG. 9 is a perspective view showing the cord member safety connector of
20 the third preferred embodiment of the present invention installed in the headrail of a window blind.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 2, a cord member safety connector 10 in accordance with
25 the first preferred embodiment of the present invention is shown comprised of a

supporting member 20 and a coupling member 30. The supporting member 20 is molded from plastics or elastic material, comprising a solid base 21 and a flat mounting portion, i.e. mounting flange 22, perpendicularly extended from the periphery of the top side of the solid base 21. The solid base 21 has a coupling portion 23 having a receiving space, e.g. a cylindrical through hole 24, which extends through the top and bottom sides of the solid base 21. The cylindrical through hole 24 has a reduced bottom end 25 of relatively smaller diameter, forming an escape opening of the coupling portion. The flat mounting flange 22 has an elongated slot 26. The coupling member 30 is a cylindrical rod member having a body portion 32, a radially compressible retaining portion, namely, the expanded top split head 31 at one end of the body portion 32 (the top split head 31 is a round head having a plurality of radial splits), and a cord member tie portion formed of a tie hole 33 at the other end of the body portion 32 for the connection of a cord member. The body portion 32 has a diameter slightly smaller than the reduced bottom end 25 of the cylindrical through hole 24. The top split head 31 is radially compressible, having a diameter slightly smaller than the cylindrical through hole 24 of the coupling portion 23 but slightly greater than the reduced bottom end 25 of the cylindrical through hole 23.

The connection between the supporting member 20 and the coupling member 30 is outlined hereinafter with reference to FIG. 3. The coupling member 30 is downwardly inserted into the coupling portion 23 of the supporting member 20 from the top side, keeping the expanded top split head 31 of the coupling member 30 stopped at the reduced bottom end 25 of the cylindrical through hole 24 of the coupling portion 23 of the supporting member 20. At this time, the coupling member 30 can be rotated in the coupling portion 23 of the supporting member 20. When the tie hole 33 of the coupling member 30 is receiving an external force that pulls the coupling

member 30 outwards from the coupling portion 23 of the supporting member 20, the expanded top split head 31 is forced against the peripheral wall of the reduced bottom end 25 of the cylindrical through hole 24 of the coupling portion 23 of the supporting member 20 and radially inwardly compressed to reduce its outer diameter and the reduced bottom end 25 is pressed to slightly expand its diameter. If the external force is continuously increased, the expanded top split head 31 will be compressed to such an extent that the diameter of the compressed top split head 31 becomes smaller than the diameter of the reduced bottom end 25 of the cylindrical through hole 24, for enabling the coupling member 30 to be disconnected from the supporting member 20.

Referring to FIG. 4, the elongated slot 26 of the flat mounting flange 22 of the supporting member 20 is fastened to the headrail A of a window blind (not shown) with a hanger B, and a cord member C is fastened to the tie hole 33 at the bottom end of the body portion 32 of the coupling member 30 after insertion of the coupling member 30 into the cylindrical through hole 24 of the coupling portion 23 of the supporting member 20. On design, the friction force F between the top split head 31 of the coupling member 30 and the reduced bottom end 25 of the cylindrical through hole 24 of the coupling portion 23 of the supporting member 20 must surpass the load of window blind W so that the coupling member 30 is normally maintained connected to the supporting member 20. When the coupling member 30 received an external force P over a predetermined value (for example, a stretching force from a child), the top split head 31 of the coupling member 30 is forced to pass through the reduced bottom end 25 of the cylindrical through hole 24 of the supporting member 20, and therefore the coupling member 30 and the cord member C are disconnected from the headrail A of the window blind; i.e., the friction force F is designed as the following formula.

load of window blind W < friction force F < external force P

In short, the main feature of the present invention is to set a safety range for the load at the cord member of the window blind so that the cord member is automatically disconnected from the window blind when received a pressure surpassed the set safety range, preventing a hanging accident of the cord member on a child playing the cord member.

FIG. 5 shows a cord member safety connector **40** according to the second preferred embodiment of the present invention, which is comprised of a supporting member **50** and a coupling member **60**. The supporting member **50** has a downwardly extended flat base **51**, and a coupling portion **53** at the base **51** for receiving the coupling member **60**. The coupling portion **53** comprises a receiving space, i.e. a circular through hole **54**, cut through the front and back sides of the base **51**, and an escape opening, i.e. a curved crevice **55** extended from the circular through hole **54** to the periphery of the base **51**. The coupling member **60** is a cylindrical member having a round head **61a** at one end, a tie hole **63** at the other end, a collar **61b** on the middle around the periphery, and a retaining portion **62** between the round head **61a** and the collar **61b**. The diameters of the round head **61a** and the collar **61b** are slightly greater than the diameter of the circular through hole **54**. The diameter of the retaining portion **62** is smaller than the diameter of the circular through hole **54** but greater than the width of the crevice **55**.

The connection between the supporting member **50** and the coupling member **60** is outlined hereinafter with reference to FIG. 6. The coupling member **60** is inserted into the circular through hole **54** of the coupling portion **53** of the supporting member **50** by force, keeping the retaining portion **62** suspended in the circular through hole **54** and the round head **61a** and collar **61b** respectively stopped at the back and front sides of the base **51**. When the cord member **63** at the tie hole **63** of the coupling member **60**

excessively stretched by an external force, the crevice 55 is forced to expand, allowing the retaining portion 62 to pass through the crevice 55 to the outside of the coupling portion 53, and therefore the coupling member 60 is disconnected from the supporting member 50.

5 FIG. 7 shows a cord member safety connector 70 according to the third embodiment of the present invention, which is comprised of a supporting member 80 and a coupling member 90. The supporting member 80 comprises a hollow base 81, a mounting portion 82 at the top side of the hollow base 81, a wire hole 86 in the mounting portion 82 for connection to the window blind, and a coupling portion 83 in
10 the hollow base 81 below the wire hole 86 for receiving the coupling member 90. The coupling portion 83 comprises a receiving space, i.e. a chamber 84, and an escape opening, i.e. a through hole 85 downwardly extended from the chamber 84 to the bottom side of the hollow base 81. The diameter of the through hole 85 is smaller than the diameter of the chamber 84. The coupling member 90 is a substantially U-shaped
15 springy member having a tie hole 91 at the bottom side, two upwardly extended parallel springy arms 92, and two rounded retaining portions 93 respectively formed integral with the distal ends of the springy arms 92.

The installation of the third embodiment of the present invention is outlined hereinafter with reference to FIGS 8 and 9. After connection of the wire hole 86 to the
20 hanger B at the headrail A of the window blind and connection of a cord member C to the tie hole 91 of the coupling member 90, the springy arms 92 of the coupling member 90 are squeezed inwards to force the retaining portions 93 toward each other for enabling the coupling member 90 to be inserted through the through hole 85 of the coupling portion 83 into the inside of the chamber 84. When released the hand from
25 the coupling member 90 after its insertion through the through hole 85 into the

chamber 84, the springy arms 92 automatically return to their former shape due to the effect of their springy material property, and therefore the separated retaining portions 93 are stopped inside the chamber 84 and prohibited from passing through the through hole 85. When the cord member C received an excessively high stretching force, the
5 springy arms 92 are forced toward each other by the peripheral wall of the through hole 85 to force the retaining portions 93 against each other, for enabling the retaining portions 93 to pass through the through hole 85, and therefore the cord member C with the coupling member 90 are disconnected from the supporting member 80 at the window blind.

10 The aforesaid three embodiments are commonly designed for use in roller blinds. Actually, the invention can be designed to connect the load-carrying cord member or exposed cord member of any of a variety of window blinds. When the load surpassed the set safety range, the cord member is disconnected in time, preventing the occurrence of an accident.

15 Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.